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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/595,660

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EXAMINER

ROE, JESSEE RANDALL

ART UNIT

PAPER NUMBER

1733

NOTIFICATION DATE

DELIVERY MODE

07/27/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@howsonandhowson.com

Office Action Summary	Application No. 10/595,660	Applicant(s) SHINDO, YUICHIRO	
	Examiner JESSEE ROE	Art Unit 1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,9-11,14,15,18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,9-11,14,15,18 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 18 November 2010 has been entered.

Status of the Claims

Claims 1-2, 9-11, 14-15 and 18-19 are pending and currently under examination and claims 3-8, 12-13 and 16-17 are canceled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 9-11, 14-15 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shindo (US 2003/0062261).

In regards to claims 1-2 and 11, Shindo ('261) discloses a high purity hafnium

metal with minimal impurities that would be used for sputtering targets to form thin films (title, abstract, [0018] and [0022]). Shindo ('261) discloses (Example 2) forming a 4N (99.99%) purity level hafnium metal excluding gas components such as carbon, oxygen, and nitrogen [0133]. Oxygen and carbon would be present at levels less than 500 ppm and forming a sputtering target or thin film and zirconium would be present at levels of 0.5 weight percent or less ([0064] and claim 7).

The Examiner notes that the composition disclosed by Shindo ('261) overlaps the composition of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amount of gas components such as oxygen, carbon, and nitrogen from the amounts disclosed by Shindo ('261) because Shindo ('261) discloses the same utility throughout the disclosed ranges.

With respect to the recitation "a sulfur content of 10wtppm or less, a phosphorus content of 10wtppm or less, and a zirconium content of 0.1wt% or less" as in claims 1-2, the Examiner notes that purer forms of known products may be patentable, but the mere purity of a product alone does not render the product unobvious. MPEP 2144.04 (VII).

With respect to the transitional phrase "consisting of" in claim 2, the Examiner notes that the products disclosed by Shindo ('261) does not require elements in addition to hafnium. Therefore, Shindo ('261) meets the claim.

With respect to the recitation "wherein said oxygen content is 10wtppm or less" of claims 9, 14 and 18, Shindo ('261) discloses that oxygen would be reduced to 500 ppm

or less [0064].

With respect to the recitation “wherein said sputtering target has a body produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot, subjecting the ingot to deoxidation with molten salt, and forming a sputtering target from the ingot after said deoxidation” of claim 10, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

With respect to the recitation “wherein said thin film is a sputtered thin film produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot, subjecting the ingot to deoxidation with molten salt, forming a sputtering target from the ingot after said deoxidation, and depositing said thin film on the substrate by performing sputtering with the sputtering target” of claim 15, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

With respect to the recitation "wherein said high purity hafnium is produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot and subjecting the ingot to deoxidation with molten salt" as in claim 19, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

Claims 1-2, 9-10 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the ASM Handbook Volume 2.

In regards to claims 1-2, the ASM Handbook Volume 2 discloses (pg. 1094, cols. 2-3) purifying metals such as hafnium to a purity approaching 99.999% by chemical vapor deposition when a low-iron starting material would be used. The ASM Handbook further discloses that if the proper temperature is maintained, oxygen, nitrogen, hydrogen, carbon, and other typical metal impurities would not be carried over.

The Examiner notes that the purity of the hafnium disclosed by the ASM Handbook Volume 2 overlaps the purity of the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed hafnium purity from the hafnium purity disclosed by the ASM Handbook Volume 2

because the ASM Handbook Volume 2 discloses the same utility throughout the disclosed range.

With respect to the recitation “A sputtering target or thin film, comprising a sputtering target or thin film formed of high purity hafnium”, the Examiner notes that although the ASM Handbook Volume 2 does not specify the size of the hafnium metal, “a sputtering target or thin film” is not defined to exclude any specific size or shape of metal. Furthermore, changing the size/proportion of the hafnium metal would not patentably distinguish over the prior art. MPEP 2144.04 (IV).

With respect to the transitional phrase “consisting of” in claim 2, the Examiner notes that the ASM Handbook Volume 2 does not require elements in addition to hafnium. Therefore, the ASM Handbook Volume 2 meets the claim.

With respect to the recitation “wherein said oxygen content is 10wtppm or less” of claims 9 and 18, the ASM Handbook Volume 2 discloses (pg. 1094, col. 2) discloses that oxygen would not be carried over. Therefore the recited residual resistance ratio would be expected. MPEP 2112.01 I.

With respect to the recitation “wherein said sputtering target has a body produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot, subjecting the ingot to deoxidation with molten salt, and forming a sputtering target from the ingot after said deoxidation” of claim 10, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability

is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

With respect to the recitation "wherein said high purity hafnium is produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot and subjecting the ingot to deoxidation with molten salt" as in claim 19, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

Response to Arguments

Applicant's arguments filed 18 November 2010 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that the teachings of Shindo ('261) teach away from the zirconium content required by the claims of the present application and that the oxygen content required by the claims of the present application is critical for

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achieving a result unexpected by one of ordinary skill in the art following the teachings of Shindo ('261).

In response, the Examiner notes that although Shindo ('261) discloses that zirconium would be present at 0.5% or less ([0031], [0064] and claim 7), Applicant has failed to demonstrate the criticality of the claimed range of zirconium over the prior art range. To establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02(d)(II).

Second, the Applicant primarily argues that one of ordinary skill in the art at the time of the effective filing date of the present application was not made aware of the lower limits of O and zirconium.

In response, the Examiner notes that in terms of the zirconium content in the hafnium being 0.5% or less and the oxygen content being 500 ppm or less, one skilled in the art would be informed that the lower limit of these ranges would be 0 ([0031], [0064] and claim 7). To establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02(d)(II).

Third, the Applicant primarily argues that Tables 1-4 on pages 7-9 of the present application as filed disclose the oxygen content and residual resistance ratio of three examples of a refined hafnium material according to the present invention before and after being subject to "deoxidation". The Applicant further argues that the ingots before "deoxidation" have oxygen contents of 250, 400 and 100 ppm and low resistance ratios

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of 38, 22 and 45, but after deoxidation, these ingots have oxygen contents of 20 ppm and less than 10 ppm and high resistance ratios of 200, 120 and 190 and thus the 40 ppm or less oxygen content provides a critical result of increasing the residual resistance ratio of the hafnium material and is completely unexpected from the teachings of Shindo ('261).

In response, the Examiner notes that none of Tables 1-4 provide the criticality of the upper limit of 1000ppm of zirconium (0.1%) since none of these Tables even provide hafnium having a zirconium content of 1000 ppm and the relative resistance ratio(s). Additionally, none of Tables 1-4 provide a hafnium material having an oxygen content of 40 ppm. Thus, Applicant's argument that criticality of the claimed ranges has been provided is not persuasive.

Fourth, the Applicant primarily argues that one of ordinary skill in the art learns from the ASM Handbook that a CVD method can be applied to "other metals" such as hafnium, but the ASM Handbook completely fails to teach, in any way the purity level of hafnium that can be achieved with the CVD method or the applicability of the iodide process to hafnium.

In response, the Examiner notes that metals such as hafnium, thorium, vanadium, niobium, tantalum, and molybdenum have been purified by chemical vapor deposition like titanium, zirconium and chromium and one skilled in the art would expect that the purities of these metals to approach 99.999%. Once a reference teaching product appearing to be substantially identical is made the basis of a rejection, and the examiner presents evidence or reasoning tending to show inherency, the burden shifts

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to the applicant to show an unobvious difference. "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products." *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)), see MPEP 2112. Applicant has not clearly shown an unobvious difference between the instant invention and the prior art's product.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jessee Roe/
Primary Examiner, Art Unit 1733